



**UNIVERSITI PUTRA MALAYSIA**

**DIVERSIFICATION OPPORTUNITIES AMONG  
SECTORS OF KLSE, ASEAN AND WORLD MARKETS  
(1986 -1996)**


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**GSM 1998 27**

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SECTORS OF KLSE, ASEAN AND WORLD MARKETS  
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**By**

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Project Paper Submitted of the Requirements for the  
Degree of Master of Business Administration in the faculty of  
Economics and Management  
Universiti Putra Malaysia

January 1998



For

Abah, Tuan Hj Rohani and Tuan Hj Shamsudin  
Emak, Puan Hajjah Rahnum and Puan Hajjah Hasiah

... your blessings are very much appreciated

Dearest Wife, Norizan  
Son, Fateh Hakeem  
Daughters, Faten Nadhirah  
and Faten Nawwarah

... thanks for all the sacrifice

Directors and Colleagues  
at Magnus Management Consultants S/B

... thanks for the support

MBA Associates, especially  
Mazlina  
Wan Zainuddin  
Affendy

... thanks for being such a good partner

## **ACKNOWLEDGMENT**

The author praise to Almighty Allah for providing the strength, energy and capability in completing this paper, Alhamdulillah.

He wishes to express his deepest appreciation to all the Professors, Associate Professors, Lectures and support staffs who had contributed their effort and time towards the MBA programme. He would also like to extend his gratitude, especially to Associate Professor Dr Shamsheer Bin Mohamad for his kind advice in preparing this project paper and to Tuan Hj Yaakob Bin Ibrahim for his assistance, in coordinating the MBA Programme. May Allah bless us all with His Rahmah and Barakah, Insya'allah.

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## ABSTRACTS

Rationale investors are risk averse and therefore tend to avoid risk. According to the Investment Theory, unsystematic risk or business risk can be diversified away. However, in the effort of making a sound investment decision, it is sometimes difficult to gather all required information prior to making a reliable judgment.

An approach to analyse the potential for diversification opportunities is to asses the correlation of returns of stocks or stock markets. The usage of stock indices to construct correlation coefficient is consistent with the weak form of Efficient Market Hypothesis. This form dictate that the prices reflects all past price and volume data. Thus, the stock indices which represent both realized prices and volume is a suitable source of data to estimate correlation coefficients.

The correlation coefficient is an appropriate tool to construct a diversified portfolio as it is directly related to the variance of portfolio returns. Results of the correlation portrays a suitable relationship for selection among the stock market indices under study. The correlation of returns can be positive or negative. The correlation coefficient magnitude suggests the degree of dependence between the indices.

The findings suggest that there are opportunities to diversify within Kuala Lumpur Stock Exchange (KLSE) sectorials. Also, there are possibility to diversify internationally and among ASEAN countries.

## ABSTRAK

Pelabur yang rasional sewajarnya menjauhi risiko. Menurut Teori Pelaburan, risiko tidak sistematik boleh disingkirkan dari portfolio melalui proses diversifikasi secara efisien. Namun, adalah sukar untuk memperolehi segala maklumat yang perlu bagi membuat keputusan pelaburan yang tepat.

Penilaian ke atas korelasi pulangan antara saham atau pasaran saham merupakan salah satu cara membentuk portfolio yang efisien. Penggunaan indeks untuk mendapatkan nilai korelasi adalah tekal dengan Hipotesis Pasaran Cepak berbentuk lemah. Format tersebut menyatakan harga pasaran meliputi segala harga saham dan volum masa lalu yang didagangkan. Maka, indeks pasaran saham sesuai digunakan kerana indeks juga meliputi harga saham dan volum dagangan yang lepas.

Koefisien korelasi merupakan alat statistik yang digunakan bagi membuat keputusan memilih aset untuk portfolio yang efisien. Ia mempunyai kaitan langsung dengan varian pulangan potfolio. Keputusan korelasi ini membayangkan hubungkait antara pasaran saham yang dikaji yang mungkin mengambil nilai positif at negatif. Magnitud koefisien korelasi korelasi pula mengunjurkan tahap hubungkait antara pasaran saham yang dikaji.

Penemuan kajian mendapati terdapat peluang bagi diversifikasi risiko di antara sektor di Bursa Saham Kuala Lumpur. Diversifikasi risiko juga boleh dilakukan di pasaran antarabangsa dan pasaran negara-negara ASEAN.

## CHAPTER ONE

### INTRODUCTION

The establishment of Kuala Lumpur Options and Financial Future Exchange (KLOFFE) offers another alternative for investors to perform their choice of diversification by using the “hedging” approach. The question of diversification arise for the investors and fund managers to minimise the risk of their investments. However, in building their investment portfolio in stocks exchange, the investors and funds managers faces great challenge to construct an efficient portfolio that will earns high yield with a minimum risk. But, there are also problems in constructing such a portfolio as illustrated by Rutterford (1983),

“When portfolio theory was discussed in the 1950s, it was not widely accepted by analyst and investors. There were two main reasons for this. Firstly, if  $n$  securities are to be considered, estimates of the value of  $n$  expected returns,  $n$  variances and  $(n^2 - n)/2$  covariances have to be made. As can be seen from Table 7.5, the number of figures required soon gets extremely large and computers in the 1950s and 1960s were slow and expensive to run.

Table 7.5 Comparison of data requirement for different sizes of portfolio

Number of securities	3	30	300
Number of data items required for calculation of efficient frontiers	9	495	45450

”

In addition, the availability of stock indices traded on futures and options market provides another means for analyst, funds managers and investors to pursue their investment strategy. The existence of technology advancement now accommodate the opportunity of global investment.

## RISK VERSUS RETURNS

As noted by Newton in his Physics theory; on every action there must be a reaction. Thus, on an action of investing, the reaction (termed as outcome), shall be in the form of risk and returns.

In investment, returns can be defined from two different perspective. First, the expected returns which holds the presumption of anticipated outcome of some future period. Secondly, the realized returns which are the actual returns on an investment for some previous period of time.

Risk on the other hands, denote the chance that the actual return on an investment will be different from the expected returns. This means the uncertainty of certain circumstances shall effect the investment decision. For example, the uncertainty to gain a 15% profit of an investment funds shall be made as a factor whether an investor will proceed with his investment decision. Should he think that the uncertainty is justifiable, then he shall invest. Otherwise he may withdraw his investment.

Most investors are risk averse, they dislike risk and they are asked to assume more risk, they will demand greater returns, from rationale perspective. Therefore, in the world of investment, risk is pretty much associated with returns, i.e. the higher the risk is the higher will be the returns. In addition, risk can be segregated into two components, as shown below:

$$\text{Total Risk} = \text{Systematic Risk} + \text{Non-Systematic}$$

Systematic risk, also known as market risk or nondiversifiable is portion of risk that is attributed to the market factors. This includes the total impact of economy towards the overall market, such as interest rates and inflation. Thus, any single investor cannot escape this risk since it is deemed as unavoidable.

On the other hand, the unsystematic risk, known as nonmarket risk or diversifiable risk is portion of total risk that reflects risk attributed to factors unique to the security. For example, should the property industry decline, due to lower business demand, manufacturing stocks may gain its strength. This means, there is a chance to shift from investing in a property to investing into manufacturing sectors as part of a diversification process.

## **THE CONCEPT OF PORTFOLIOS**

Portfolio is the securities (or assets) held by the investor, taken as a group with its own characteristics; formed as an optimal combination from the investor point of view. For example, the portfolio of an investor may comprise of stocks in the industrial, properties and plantation sectors. He may also holds treasury bills and government bonds for a certain period of time.

Prior to having the portfolio, the investor must first determine and choose the securities that suits the portfolio he wants to construct. This include evaluating the securities that fit the requirements of the portfolio under construction. Once the portfolio has been built, it has to be revised to accommodate changes in the markets. This means, a portfolio is actively managed, which involves changing of shares and

their weights in accordance to the changes in the market, to keep the targeted returns intact.

## **DIVERSIFICATION**

Investors have known diversification intuitively for many years that is, not to “put all of your eggs in one basket”. In 1950s, Harry Markowitz originated the concept of portfolio diversification in a formal way. He had showed quantitatively why and how portfolio diversification works to reduce risk of a portfolio to an investor. The specific measures of portfolio risk and derivation of expected returns and risk for a portfolio is based upon covariance relationship. The details are discussed in Chapter Three.

Nevertheless, it is important when an investor decides to invest, the objective to diversify the investment risk should be considered as a factor, despite higher expected returns of the securities which is associated with the risk.

## **EFFICIENT MARKET HYPOTHESES**

Investors normally make decision based upon available information. In an efficient market, all information is reflected in the stocks prices. It was also noted by many scholars that the Efficient Market Hypothesis (EMH) dictate the behavior of stock market. Whether in its strong, semi-strong or weak form, many researchers tried to established the link towards the stock market behavior and some source of published information.

The strong form stipulate that stocks prices reflect all information, despite it being public or non-public. Thus, no group of investors shall earn abnormal rates of returns over a period of time by using public information. This also applies to non-public but price sensitive information which is available to the restricted group of people such as the corporate insiders or the exchange specialists.

The semi-strong form efficiency postulates that the information publicly available (such as earnings, dividends, stocks splits announcement, accounting changes and the like) would be reflected in the stocks price. This means, the semi-strong form is more inferior compare to the strong form, with respect to market efficiency, which assume all information (available publicly or non-publicly) is reflected in the share price.

The weak form, being the most minor type of EMH, dictate that only past market data, i.e. the past price (and volume) information is already discounted in the share price.

## **PROBLEM STATEMENT**

The problem in constructing an efficient portfolio is the large number of data required as input. One way to reduce the problem of large data set is the use of stocks indices as proxy towards groups of stocks serves as a simplification approach in initial investment decision-making, that is identifying the stock exchange and industry to invest in.



The problem of identifying the right shares while maintain risk diversification is the main agenda for investors, analyst and fund managers. In their active management of the portfolio, specifically, the investors in Kuala Lumpur Stock Exchange (KLSE) may wonder, which group of stocks provides them with most opportunities to diversify risk. Further, to ascertain if there is any significant relation with other stock markets, namely the major world bourses and ASEAN bourses; where the investors could exploit an opportunity to diversify risk beyond national boundaries.

## OBJECTIVES

The main objectives of this paper are

1. To analyse the relationship within various KLSE sectorials and with major world and ASEAN bourses based upon *ex post* data.
2. To study the trends and correlation patterns of the above mentioned indices.

The results of this study would also be able to assist investors to preliminary determine which bourses are potential source for risk diversification and which sector of KLSE could be the best choice to minimise risk.

Although KLSE is usually described as an emerging market, but by some standards it can be considered well-developed. Thus, another advantage of this study is to review the relationship between emerging market such as the KLSE and its counter-part in the ASEAN region as well as the to examine the relationship with

developed markets such as Tokyo Stock Exchange (TSE) and London Stock Exchange (LSE).

## **KLSE HISTORICAL BACKGROUND**

The history of share trading in Malaysia basically originated from the British corporate enterprise in Peninsular Malaysia who act as the catalyst. It dated back to the late nineteenth century when stockbrokers used to gather informally in the Arcade in Raffles Place, Singapore to purchase and sell shares for the clients. This activity of was then very much focused on rubber and tin-based companies. The rubber boom in 1910 provided the arena to the unorganised share trading to become a major stockbroking activity. The market during those days were very much influenced by the direction and needs of the British business community as well as individual investors.

In the year of 1938, the Malayan Stockbrokers Association was formed. It consisted of both Singapore and Peninsular Malaysia stockbroking companies who offered public trading. In August, 1963, when Singapore joined Malaysia, the Exchange was renamed to Stock Exchange of Malaysia. Although, Singapore was separated from the Federation of Malaysia, in August, 1965, the stockbroking function remains. However, the name was changed to the Stock Exchange of Malaysia and Singapore.

The Malaysian government expressed their intention to split the joint body of the exchange in May 1973. The enactment of Securities Industries Act provided the

regulatory structure for the detachment of the exchange and in July 1973, the Kuala Lumpur Stock Exchange was established and incorporated under the Malaysian Companies Act of 1965.

Despite the split with Singapore, some Malaysian-registered companies remained listed on the Stock Exchange of Singapore and vice versa. The collapse of the Pan-Electric Industries group in Singapore forced the temporary closure of KLSE in 1985. Thus, in October 1989, Malaysian government announced that by January 1, 1990, Malaysian-registered companies should be delisted from SES.

The semi-automated system of trading was introduced in November, 1989, replacing the open outcry system, operating from the then Exchange Square in Damansara. Another major milestone achieved by KLSE was the implementation of scriptless trading based on a central depository system (CDS), in 1992. KLSE moved to their new premise at the heart of Kuala Lumpur on August 15, 1997 which embarked the readiness to face challenges of the next millenium.

## CHAPTER TWO

### REVIEW OF LITERATURE

This chapter shall first explain the significant of the stock market indicators, which is noted by the stock indices. Then a review is made to highlight some of the work conducted in analysing the stock market relationship using correlation perspective.

### INDICES

In his literature, Allen (1975), noted the definition of indices given by Edgeworth as

“... a number adapted by its variations to indicate the increase or decrease of a magnitude not susceptible of accurate measurement. pp2”

Further, Bowley’s definition, which is seen as more developed, constitute that

“Index-numbers are used to measure the change in some quantity which we cannot observe directly, which we know to have a definite influence on many other quantities which we can so observe, tending to increase all, or diminish all, while this influence is concealed by the action of many causes affecting the separate quantities in various ways.”

The index numbers is limited to measure of changes in the magnitude from one situation to another. However, the two situation compared are not restricted. For example, comparing of two different periods, (e.g. two years); or two spatial sense (e.g. between two regions or countries); or two groups.

As the index numbers measures changes, they are expressed with a base line as 100; which is called the reference base of the series of index numbers. Further, the choices of formula to construct the indices can be divided into two, namely Stochastic approach and Aggregative or Weighted Average approach.

The stochastic approach aims at a broad objective, typically the general level of price or the value of money, without specific reference to any group or application to any set of circumstances. It has been noted as relatively simple. On the other hands, the aggregative approach has a reference to some aggregate and to some group specified in advance.

In general, the indices are used to represent the change of values of a specified object under observation. In the case of this study, the object is a group of stocks price movement which was noted by the stocks indices.

Nelson (1991), made a comparison between three published indices, namely, Salomon-Frank Russel Europe-Asia index (SFR), the Morgan Stanley-Capital International EAFE index (MSCI) and the Financial Times Europe-Pacific Basin index. He noted that the logic of index construction should incorporate the weighting of stocks, rules to include or exclude the stocks, and the method for updating the stocks in the index. There were various mathematical formula and approach used to compute the index, such as equal weighting, price weighting and capitalization weighting.

In the case of KLSE, computation of indices can be summarised as follows:

$$\text{Index} = \frac{\text{AMV}_1}{\text{AMV}_0} \times 100$$

where,  $\text{AMV}_1 = \sum P_1 Q_1 = \text{Current Aggregate Market Value}$

and,  $\text{AMV}_0 = \sum P_0 Q_0 = \text{Base Aggregate Market Value}.$

The index is calculated by the weighted average method. The weight used is the number of ordinary shares outstanding.

On the other hand, the Singapore's Straits Times Indices are the unweighted type, and they are computed according to the following formula:

$$\text{Index} = \frac{\text{AMV}_1}{\text{AMV}_0} \times 100$$

where,  $I_t = \text{value of index at time } t,$

$P_{it} = \text{price of } i^{\text{th}} \text{ stock at time } t,$

$P_{ib} = \text{price of } i^{\text{th}} \text{ stock at the base period},$

$n = \text{number of shares in the index}.$

Although there were differences in constructing the stock indices, as the case for KLSE and Stock Exchange of Singapore (SES), both methods signify prices of all the stocks and the volume of the stocks. This is in accordance to the weak form of the Efficient-Market Hypothesis. Thus, the use of stock market indices is still suitable to measure behavior of the market with respect to portfolio risk. We shall discuss the portfolio risk in greater details in Chapter Three.

## LITERATURE ON STOCK INDICES CORRELATION

Studies on risk diversification through stock indices correlation approach were initiated by the needs to analyse returns and risk of different bourses. This was facilitated by the availability of the stock indices information and the correlation methodology as a tool to analyse relationships. Further, this relationships were interpreted in order to enable investors to develop and justify their investment decision. This section reviews the findings on some of these studies.

The evidence of using correlation as a tool to analyse diversification has been discussed by Erb, Harvey and Viskanta (1994). They had tried to forecast the international equity correlation of between U.S. equity market and other G-7 countries. They found out that correlation structure of equity returns is important especially during the business cycle. The results show that correlation are higher during recession rather than during growth period. Correlation are low if the two countries business cycle are out of phase. They had also stressed that correlation is an important input for portfolio management.

Odier and Solnik (1993) noted that the idea of investing internationally is to increase profit potential and at the same time provides risk diversification. They conducted the study on U.S. against other market such as Germany, Belgium, Netherlands, United Kingdom, Hong Kong, Japan, Singapore and Canada for a period between 1989 to 1990. What they found out was, the correlation between U.S. and other markets tends to be around 0.5, in average. They also pointed-out that the correlation between the bourses have not increased. However, correlation are larger

when markets are more volatile. The result of this scenario is that investors and fund managers would increase diversification benefits (and low correlation value) if the down movements is large. Nevertheless, they argued that the correlation depends relatively on national economies and monetary policies.

In addition, Kandel and Stambaugh (1987) highlighted the correlation between portfolio and market proxy. They further tested the sensitivity analysis of mean-variance relations for the portfolios and market proxy. They found out that the market proxy and the portfolio correlation is sensitive to the construction of the efficient set. This shows the difficulty of developing an efficient set of portfolio.

Further study was carried out by Farrell (1989) on the forecasting on asset allocation. His observation concentrates on patterns of correlation between stocks and bonds. He found out that the patterns between stocks and bonds were positively strong. However, he suggested that the asset allocation (or investment decision) should accommodate the changing correlation pattern in order to generate an appropriate asset mix. The signification of the study was the emphasis on changes of correlation pattern over time.

Zimmermann and Zogg-Wetter (1992) focused on the timing benchmarking of Swiss stock indices. They found out that coefficient between five Swiss stock indices were highly correlated. It was also noted that the timing ability of these indices showed the diversion from traditional study on stock indices. This uncovered another approach of study on lag between stock indices.



Another study conducted by Garcia and Gould (1991) recognised the importance of Indexing. They observed the passive indexing methodology by active manager and announced that in order for active manager to out-performed the indices they must also be actively analyse the indices. The evidence showed that indices constitute the competitive behavior of fund managers.

Moreover, the study on international diversification was also conducted by Heston and Rouwenhorst (1994). They examined the influenced of industrial structure on cross-sectional volatility and correlation structure of 12 European countries between 1978-1992. It was found out that the correlation between country indices is low. They had implied that this phenomena is due to country-specific resources of return variation. Also, they suggested that diversification across countries within an industry is much more effective for risk reduction rather than industry diversification within a country.

Study by Gyourko and Keim (1993) portrayed an evidence on real estate stock index risk and returns. They considered the relation between the stock-based and appraisal-based series. It was noted that the lagged returns of real estate stock explained the behavior of current-period appraisal series. They concluded that the information impounded on real estate indices shows significant measures on real estate conditions and this was shown by correlation test with long-term bond.

In their anthology of articles Ismail Ibrahim and Othman Yong (1993) portrayed works conducted by Insup Lee, R. Richardson Petit and Mark V.